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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/891,002

06/25/2001

Scott Burgett

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9418

7590

10/03/2003

Devon A. Rolf  
GARMIN INTERNATIONAL, INC.  
1200 East 151st Street  
Olathe, KS 66062

EXAMINER

SUN, XIUQIN

ART UNIT

PAPER NUMBER

2863

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/891,002

Applicant(s)

BURGETT ET AL.

Examiner

Xiuqin Sun

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3,6,11-17 and 21-36 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7,8,10 and 18 is/are rejected.
- 7) ☒ Claim(s) 9,19 and 20 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____   |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____     | 6) <input type="checkbox"/> Other:  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 4-5, 7-8, 10 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al. (U.S. Pat. No. 6216064) in view of McBurney et al. (U.S. Pat. No. 6055477).

Johnson et al. teach a navigation device comprising: a barometric altimeter for obtaining barometric elevation readings based on barometric pressure measurements (col. 3, lines 25-38; col. 4, lines 20-21; col. 5, lines 38-43); a processor for providing GPS elevation readings based on GPS measurements, said processor calculates barometric elevation based on the pressure signal, said processor is further configured to correct the barometric elevation with the GPS signal (col. 2, lines 57-67 and col. 3, lines 1-20); and a complementary filter which combines the long-term accuracy of GPS measurements with the short-term accuracy of barometric elevation (col. 3, lines 21-55). Johnson et al. further teach a method for estimating altitude based on GPS and barometric measurements, comprising: deriving a barometric altitude from a barometer pressure measurement and an atmospheric pressure model (col. 6 lines 55-67; and col.

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7, lines 1-23); deriving a GPS altitude from GPS information (col. 8, line 64 to col. 9, line 25); correcting said barometric altitude based on a coarse calibration of the atmospheric pressure model to obtain a coarse estimated barometric altitude (col. 9, lines 46-67); and after obtaining the coarse estimated altitude, correcting the barometric altitude based on a difference between the coarse estimated barometric and GPS altitude to obtain a fine estimated altitude (col. 10, lines 49-67 and col. 17, lines 1-33). Johnson et al. further teach that: a calibration unit calibrating said barometric altimeter based on said barometric altitude correction quantity continuously while simultaneously providing navigation information (col. 9, lines 48-65; col. 18, lines 6-36; col. 19, lines 58-67 and col. 20, lines 1-4); said filter performs the filtering operation based upon one of multiple sets of filter gain parameters, said processor setting said filter, when initially turned to one of said multiple sets of filter gain parameters based upon an elapsed time since said barometric altimeter was last calibrated (col. 10, lines 37-46, lines 50-67; col. 11, lines 1-16; col. 18, lines 6-36; col. 19, lines 58-67 and col. 20, lines 1-4); said filter uses a first set of filter gain values to perform short-term averaging of said differences and a second set of filter gain values to perform long-term averaging of said differences (col. 9, lines 49-67; col. 10, lines 1-46; col. 17, lines 60-67; col. 18, lines 1-3 and col. 19, lines 28-30); said processor and filter calibrate said barometric altimeter while the navigation device is in motion during which elevation changes (col. 9, lines 48-65); said processor and filter continuously calculate said barometric altimeter correction quantity throughout operation while in a navigation mode (col. 9, lines 48-65; col. 18, lines 6-36; col. 19, lines 58-67 and col. 20, lines 1-4); an atmosphere model associating barometric

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pressure measurements to elevations, said processor adjusting said atmosphere model at least once during operation by recalculating said elevations associated with said barometric pressure measurements based on said differences between said barometric elevation readings and GPS elevation readings (col. 7, lines 12-35; col. 13, lines 1-67 and col. 14, lines 1-20).

Johnson et al. do not mention explicitly: said processor calculating differences between said barometric elevation readings and said GPS elevation readings; said filter filtering said differences to produce a barometer correction quantity, said filter being adjustable between a short time constant and a long time constant.

McBurney et al. teach methods for GPS-assisted determination of barometric elevation, wherein differences between barometric elevation readings and the GPS measurements are calculated (col. 8, lines 56-67, col. 9, lines 1-10, col. 9, lines 66-67, col. 10, line 1, col. 10, lines 59-67; col. 11, lines 1-29, col. 11, lines 54-67 and col. 12, lines 1-6). McBurney et al. further teach: a filter filtering said differences to produce a barometer correction quantity, said filter being adjustable between a short time constant and a long time constant (col. 10, lines 47-58; col. 12, lines 34-67, col. 13, lines 1-67 and col. 14, lines 1-37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the teaching of McBurney et al. in the Johnson system in order to combine a GPS unit and a barometric sensor to calculate altitude based upon comparison of time varying statistical parameters corresponding to the altimeter and the GPS (McBurney et al, Abstract).

***Allowable Subject Matter***

3. Claims 9, 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
4. Claims 3, 6, 11-17, 21-36 are allowed.

***Reasons for Allowance***

5. The following is an examiner's statement of reasons for allowance:

The primary reason for the allowance of independent claim 3 is the inclusion of the limitation of a statistical model of barometric altimeter errors represented expected drift in the barometer elevation reading over a time lapsed since the device was last turned on, said filter adjusting filter characteristics between high and low gain based on said statistical model. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of independent claim 6 is the inclusion of the limitation of a statistical model of anticipated errors in said barometric elevation readings, said filter using low gain when said statistical model indicates that an anticipated error is small, said filter using high gain when said statistical model indicates that an anticipated error is large. It is this limitation found in the claim, as it is claimed in

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the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 9 is the inclusion of the limitation that said barometric altimeter calculates barometric elevation readings based on an atmosphere model correlating barometric pressure readings to particular elevations, and said processor adjusts said atmosphere model continuously throughout operation based on said barometric altimeter correction quantity. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of claims 11-15 is the inclusion of the limitation of utilizing a state feedback loop to drive said difference between said first and second elevations to zero. It is this limitation found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 16 and 17 is the claimed method step of obtaining from a barometer drift model, an expected error in barometer readings based on the time lapse since last calibration. It is this limitation found in each of the claims, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of dependent claim 19 is the claimed method step of adjusting an initial base pressure of the atmospheric pressure model toward a standard pressure value based on an amount of uncertainty in the barometric

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altitude. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of dependent claim 20 is the claimed method step of adjusting an initial base pressure of the atmospheric pressure model toward a standard pressure value based on an amount of uncertainty in the GPS altitude. It is this limitation found in the claim, as it is claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes this claim allowable over the prior art.

The primary reason for the allowance of claims 21-34 is the claimed method steps of determining an expected drift error representing an amount of drift anticipated in said barometer-based altitude based on a model of drift error; calculating a correction quantity based on convergence of a baro-GPS relation between said barometer-based and GPS-based altitudes toward a steady state value; and adjusting a rate of said convergence toward said steady state value based on said expected drift error. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

The primary reason for the allowance of claims 35-36 is the claimed method steps of re-calibrating said atmospheric pressure model by changing a model base pressure as a function of said barometric pressure and the barometric altitude calculated from the atmospheric model; and correcting said barometric altitude based



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on said re-calibrated atmospheric pressure model. It is these limitations found in each of the claims, as they are claimed in the combination, that has not been found, taught or suggested by the prior art of record which makes these claims allowable over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

***Response to Arguments***

7. Applicant's arguments with respect to claims 1-2, 4-5, 7-8, 10 and 18 have been considered but are moot in view of the new ground(s) of rejection.

Claims 1-2, 4-5, 7-8, 10 and 18 are rejected as new art (U.S. Pat. No. 6055477) has been found to teach the limitations of correcting said barometric altitude based on a difference between barometric and GPS altitudes and a time varying filter for filtering the corrected barometric altitude. For more detailed response, please refer to section 2 set forth above in this Office Action.

***Contact Information***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Xiuqin Sun whose telephone number is (703)305-3467. The examiner can normally be reached on 7:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (703)308-3126. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

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XS

September 13, 2003

*John Barlow*  
John Barlow  
Supervisory Patent Examiner  
Technology Center 2800